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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/835,711	04/16/2001	Kia Silverbrook	360040-21	7729

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EXAMINER

LIANG, LEONARD S

[REDACTED]
ART UNIT PAPER NUMBER

2853

DATE MAILED: 10/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/835,711	SILVERBROOK, KIA
	Examiner	Art Unit
	Leonard S Liang	2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 138-154 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 138-154 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 16 April 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) Other: _____

DETAILED ACTION

Notice to Applicant

1. Claims 130-137, submitted in the first 04/16/01 amendment, has been cancelled as instructed in the 08/19/02 amendment.
2. Claims 175-191, submitted in the second 04/16/01 amendment, has been renumbered as claims 138-154 in accordance with 37 C.F.R. 1.126.
3. For the remainder of the prosecution, the claims shall be referred to under the updated numbering scheme.
4. The previous office action is vacated in lieu of the crossing of the 08/19/02 amendment with the 08/21/02 office action in the mail.

Oath/Declaration

5. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not note the divisional application under 37 C.F.R. 1.53(b) filed in the specification. Also the divisional application fails to note a serial number.

Specification

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
7. The disclosure is objected to because of the following informalities: The reference to a divisional application does not include the serial number of the divisional application. Appropriate correction is required.

Claim Objections

8. Claim 142 is objected to because of the following informalities: The limitation "wherein said interconnect means also includes a plurality of control lines for connection **to selected other** of said voltage supply points..." is not grammatically correct. It will be construed that the claim should read "wherein said interconnect means also includes a plurality of control lines for connection **to selected others** of said voltage supply points..." Appropriate correction is required.
9. Claim 143 is objected to because of the following informalities: The claim recites the limitation "**flexible interconnect means**" in the disclosed power distribution arrangement. There is insufficient antecedent basis for this limitation in the claim. It will be construed that the claim should read "wherein said **interconnect means** is in the form..."
10. Claim 150 is objected to because of the following informalities: The claim recites the limitation "**ink supply unit**" in the disclosed power distribution arrangement. There is insufficient antecedent basis for this limitation in the claim. It will be construed that the claim should read "A power distribution arrangement according to claim 149 having an ink supply unit..."

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claim 146 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

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Claim 146 recites that “said control line interconnect means are also repeatedly connected with said power supply busbars.” Claim 145 defines the control line interconnect means to be a means for connection to external control lines. The specification discloses these control line interconnect means on page 50, lines 8-12 and in figures 102, references 550 (control line interconnects) and 552 (busbar contacts). The description does not disclose how to use the invention with the control line interconnect means connected to the power supply busbars. Instead, the specification and figures 102 and 103 indicate that the control lines from among the transversely extending connecting lines 553 are connected to control line interconnects 550 which releasably connect to external control lines.

Claim Rejections - 35 USC § 103

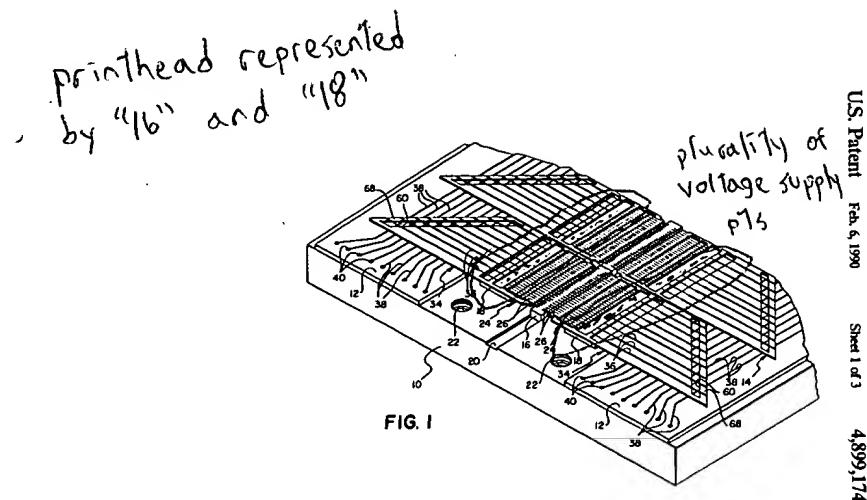
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 138-143, 147-154 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman (US Pat 4899174) in view of Hanson (US Pat 4635073), and further in view of Shepherd (US Pat 6255588) and Ng (US Pat 5914,744).

Newman discloses, with respect to claim 138,

- a power distribution arrangement (See figure, reference 38; column 4, lines 1-11)
- for an elongate printhead (See figure 1, references 16, 18; column 1, lines 1-22)
- of a kind having a plurality of longitudinally spaced voltage supply points (See figure 1, drawn-in reference)



the power distribution arrangement including:

- interconnect means connecting the voltage supply points to power (See figure 1, reference 36, 38; column 4, lines 1-11)

Newman discloses, with respect to claim 140 and 153, that the interconnect means is in the form of a TAB film (See column 2, lines 64-68) which connects with the printhead; TAB is inherently flexible. This property of TAB is well known to one of ordinary skill in the art.

Newman discloses, with respect to claim 141, noble metal deposited strips formed on the TAB film.

Newman discloses, with respect to claim 142, that the interconnect means also includes a plurality of control lines for connection to selected others of the voltage supply points on the printhead (See figure 1, references 36, 38; column 4, lines 1-11).

Newman discloses, with respect to claim 143, that the interconnect means is in the form of one or more circuit boards, with TAB connecting printed circuit boards to the printhead (See figure 1, reference 12; column 1, lines 15-22; column 3, lines 39-43).

Claims 147-148 are rejected because the limitation “the printhead” does not add further limitation to the “power distribution arrangement”; the printhead is not part of the power distribution unit.

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Claims 150-151, 154 are rejected because the limitation “the ink supply unit” does not add further limitation to the “power distribution arrangement”; the ink supply unit is not part of the power distribution unit.

Newman differs from the claimed invention in that it does not disclose an inkjet printhead.

Newman differs from the claimed invention in that it does not disclose two or more elongate low resistance power supply busbars.

Newman also differs from the claimed invention in that it does not disclose that the busbars are disposed to extend parallel to the printhead and the interconnect means provide interconnections extending generally transversely therebetween.

Newman also differs from the claimed invention in that it does not disclose that the circuit boards connect directly to the busbars.

Newman also differs from the claimed invention in that it does not disclose that the circuit boards connect to the busbars, with **wire bonds** connecting the printed circuit boards to the printhead.

Newman also differs from the claimed invention in that it does not disclose that the low resistance busbars and flexible interconnect means are packaged with an associated ink supply unit for delivering ink to ink supply passages formed in the printhead.

Finally, Newman also differs from the claimed invention in that it does not disclose that the busbars comprise two mechanically stiff conductive rails.

Hanson discloses, with respect to claim 138,

- an inkjet printhead (See column 1, lines 40-46)
- low resistance power supply busbars (See figure 2a, reference 64, 66; column 3, lines 38-52)

Shepherd teaches, with respect to claim 138, that “the advantages of a buss bar, as opposed to using a number of individual power transmission lines (i.e. power strips “38”)...are well known to those in the art. Such advantages include, for example...a reduction of noise...” (See column 2, lines 16-25).

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Hanson discloses, with respect to claim 139, that the busbars are disposed to extend parallel to the printhead and the interconnect means provide interconnections generally transversely therebetween.

Newman teaches, with respect to claim 143, that "Tape automated bonding or TAB is a technology that has become increasingly popular in recent years as an alternative to individual wire bonding..." (See column 2, lines 1-3) Thus, TAB and wire bonding can be considered equivalent replacements.

Hanson discloses, with respect to claim 149, ink reservoirs and ink orifices (See column 2, lines 53-58).

Shepherd discloses, with respect to claim 152, busbars as heavy rigid (stiff) conductors (See column 2, lines 4-9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the LED array printhead disclosed by Newman with the inkjet printhead disclosed by Hanson. The motivation for the skilled artisan in doing so is to gain the benefit of being able to print directly onto the recording medium; the benefits of using ink-jet print heads as opposed to LED printheads is well known to one of ordinary skill in the art.

It would have been further obvious to one having ordinary skill in the art at the time the invention was made to replace the far left and far right power strips "38" disclosed by Newman with the busbars disclosed by Hanson in order to supply power to the voltage supply points. The motivation for the skilled artisan in doing so is to gain the benefit of reducing undesirable electrical noise, as taught by Shepherd. This new combination of Newman with Hanson naturally suggests, with respect to claim 139, that the busbars are disposed to extend parallel to the printhead and the interconnect means provide interconnections therebetween. The new combination also suggests, with respect to claim 143, the printed circuit boards connect directly to the busbars.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the TAB interconnect circuit disclosed by Newman with the wire bonds taught by Newman. This is obvious because they are equivalent replacements, as taught by Newman. Furthermore, in view of this replacement, the new combination of Newman with Hanson suggests that wire bonds can connect the printed circuit boards to the printhead.

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It would have also been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ink reservoirs and ink orifices disclosed by Hanson into the invention of Newman. The motivation for the skilled artisan in doing so is to gain the benefit of being able to deliver ink to ink supply passages formed in the printhead.

It would have also been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Shepherd into the modified invention of Newman, in view of Hanson, so that the busbars comprise mechanically stiff rails. The motivation for the skilled artisan in doing so is to gain the benefit of better structural integrity and strength in the busbars. The strength and structural integrity of heavy rigid metals is well known to one of ordinary skill in the art.

13. Claim 144 is rejected under 35 U.S.C. 103(a) as being unpatentable over Newman, in view of Hanson, Shepherd, and Ng, as applied to claim 138 above, and further in view of Arai (US Pat 4506272).

Newman differs from the claimed invention in that it does not disclose that the interconnect means is configured so that it need only be connected to the printhead along one edge thereof.

Arai discloses, with respect to claim 144, that the interconnect means (semiconductor device) is connected to the printhead (heater array which integrally constitutes printhead; see column 1, lines 5-10) along one edge thereof (See figure 1B, references 10, 20; column 3, lines 7-27). It also teaches that figures 1A (interconnect means connect to printhead along two edges) and 1B (interconnect means connect to printhead along one edge) are alternative arrangements (See figures 1A and 1B, column 3, lines 7-12); thus they can be considered equivalent replacements.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Arai into the invention of Newman so that its interconnect means is configured so that it need only be connected to the printhead along one edge thereof. This would have been obvious because the interconnect means provides power from the busbar to the printhead regardless of whether it is connected to the printhead along one

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edge or two thereof; the connecting along one edge and the connecting along two edges can therefore be considered equivalent.

14. Claim 145 is rejected under 35 U.S.C. 103(a) as being unpatentable over Newman, in view of Hanson, Shepherd, and Ng, as applied to claim 140 above, and further in view of Meyer (US Pat 5612511).

Newman discloses, with respect to claim 145, a two-layer TAB film.

Newman differs from the claimed invention in that it does not disclose a double-sided TAB film.

Meyer discloses, with respect to claim 145, a double-sided electrical interconnect flexible circuit (See abstract; column 2, lines 28-30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Meyer into the invention of Newman by replacing the two-layer TAB film with a double-sided TAB film. The motivation for the skilled artisan in doing so is to gain the benefit of cutting costs. Meyer teaches that making double-sided interconnect flexible circuits is cheaper than making two-layer flex circuits (See column 2, lines 16-23).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Silverbrook (US Pat 5815173) discloses a ZBJ printhead chip (See figure 20, reference 100; column 19, lines 13-42), as well as an ink supply unit (See figure 20, references 210-214).

White (US Pat 5494698) teaches that thermal ink jet printheads are an example of MEMS produced technology.

Firl (US Pat 4989317) discloses a method for making TAB circuit electrical connector supporting multiple components thereon.

Childers (US Pat 5471163) discloses TAB circuit fusible links for disconnection or encoding information.

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Tran (US Pat 6244696) discloses an inkjet print cartridge design for decreasing ink shorts by using an elevated substrate support surface to increase adhesive sealing of the printhead from ink penetration.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard S Liang whose telephone number is (703) 305-4754. The examiner can normally be reached on 8:30-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703) 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

lsl LSL
October 1, 2002

John Barlow
Supervisory Patent Examiner
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John Barlow